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Performance Comparison of Nb_3Sn magnets at LBNL

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The Superconducting Magnet Group at the Lawrence Berkeley National Laboratory has been successfully developing Nb_3Sn high-field dipole magnet technology for ten years. Noteworthy technology tests include D20 (4-layer cosθ, 13.5T, accelerator quality, 50mm bore), and recent racetrack magnets: 1) RT1 (2-layer, 12T, no bore, no training), 2) RD3b (3-layer, 14.7T, 10mm bore), 3) Rd3c (3-layer, 12T, low-harmonic 35mm bore), and 4) some small Nb_3Sn magnets that utilized some advanced technology.
We summarize the performance for these magnets, comparing 1) cable and geometry parameters, 2) RRR measurements, 3) training behavior, 4) ramp-rate sensitivity, 5) peak temperatures and voltages, and 6) fast flux adjustments that occur during ramping, most of which indicate conductor motions that are too small to trigger a quench.

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